# PA NT COOPERATION TREAT

To:

<b>-</b>	A L	INTER	BIAT	ALACI	I DII	DEAL
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# PCT

### NOTIFICATION OF ELECTION

(PCT Rule 61.2)

LEE, Jae-Sung

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202

Date of mailing:

07 December 2000 (07.12.00)

International application No.:

PCT/KR99/00545

ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Applicant's or agent's file reference:

99-PCT-006

International filing date:

14 September 1999 (14.09.99)

Priority date:

31-May-1999 (31.05.99)

1. The designated Office is hereby notified of its election made:

| X | in the demand filed with the International preliminary Examining Authority on:
| 13 January 2000 (13.01.00)
| in a notice effecting later election filed with the International Bureau on:
| 2. The election | X | was | was not | was no

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Authorized officer:

J. Zahra

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

Applicant:

From the

## INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To

YIM Suk Jae YOON, Woo Sung 8th Floor, Poonglim Bldg., 823-1 Yeoksam-dong, Kangnam-ku, Seoul 135-784, Republic of Korea

# PCT

# NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing (day/month/year)

5 November 2001 (05.11.01)

Applicant's or agent's file reference

99-PCT-006

International filing date (day/month/year)

Priority Date (day/month/year)

IMPORTANT NOTIFICATION

International application No. PCT/KR 99/00545

14 September 1999 (14.09.99)

31 May 1999 (31.05.99)

Applican

SAMJIN Intelligence Communication CO., Ltd. et al.

- 1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
- 2. A copy of of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the eleceted Offices.
- 3. Where required by any of the elected Offices, the Interational Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/AT

Austrian Patent Office

Kohlmarkt 8-10

A-1014 Vienna

Facsimile No. 1/53424/200

Authorized officer

Wolf

Telephone No. +43 / 1 / 53424 - 450

2001.11.12

Form PCT/IPEA/416 (July 1992)

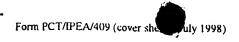


# $\mathbb{PCT}$

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference							
99-PCT-006	FOR FURTHER ACTIO	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)					
International application No.	International filing date (day/m	nonth/year) Priority Date (day/month/year)					
PCT/KR 99/00545	14 September 1999	31 May 1999 (31.05.1999)					
	(14.09.1999)						
International Patent Classification (IPC) or nation	onal classification and IPC						
IPC <sup>7</sup> : G02B 6/44, H02G 15/10, 1	5/18						
Applicant SAMJIN Intelligence Communicate	tion CO., Ltd. et al.						
This international preliminary exa and is transmitted to the applicant	mination report has been pre t according to Article 36.	epared by this International Preliminary Examination Authority					
2. This REPORT consists of a total of	of <u>4</u> sheets, inclu	uding this cover sheet.					
amended and are the basis	This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).						
These annexes consist of a total o	f sheet	ets.					
3. This report contains indications re	lating to the following items	s:					
I. Basis of the opin	ion .						
II. Priority		·					
III. Non-establishmer	nt of opinion with regard to	novelty, inventive step and industrial applicability					
IV. Lack of unity of i	nvention						
V. Reasoned statement citations and ex	ent under Rule 66.2(a)(ii) w planations supporting such s	rith regard to novelty, inventive step or industrial applicability; statement					
VI. Certain documen	ts cited						
VII. Certain defects in	the international applicatio	on					
VIII. Certain observati	ons on the international appl	lication					
Date of submission of the demand	Dai	ate of completion of this report					
13 January 2000 (13.		27 July 2001 (27.07.2001)					
Name and mailing address of the IPEA/A	T Au	thorized officer					
Austrian Patent Office		CDOMALL					
Kohlmarkt 8-10		GRONAU					
A-1014 Vienna Facsimile No. 1/53424/200	Tel	lephone No. 1/53424/3 <b>20</b>					
1 aconditic 140. 1/33424/200		rereptione No. 1/33424/320					





International application No.

PCT/KR 99/00545

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

I.		Basis of the report
1.	Wit	n regard to the elements of the international application:
	$\boxtimes$	the international application as originally filed
		the description:
		pages, as originally filed
		pages, filed with the demand
		pages, filed with the letter of
		the claims;
		pages, as originally filed
		pages, as amended (together with any statement) under Article 19
		pages, filed with the demand
	_	pages, filed with the letter of
		the drawings:
		pages, as originally filed
		pages, filed with the demand
		pages, filed with the letter of
		the sequence listing part of the description:
		pages, as originally filed
		pages, filed with the demand
		pages,, filed with the letter of
2.	WILL	regard to the language, all the elements marked above were available or furnished to this Authority in the language in h the international application was filed, unless otherwise indicated under this item.  e elements were available or furnished to this Authority in the following language which is:
		the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
	_	the language of publication of the international application (under Rule 48.3(b)).
	ليا	the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3.	With preli	regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international minary examination was carried out on the basis of the sequence listing:
		contained in the international application in printed form.
		filed together with the international application in computer readable form.
		furnished subsequently to this Authority in written form.
	_	furnished subsequently to this Authority in computer readable form.
	_	The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
	Ц	The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4.		The amendments have resulted in the cancellation of:
		the description, pages
	ļ	the claims, Nos.
	_	the drawings, sheets/fig
5.		his report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**
* R	eplace	ment sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to
"	i this r 0.17).	eport as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and
		lacement sheet containing such amendments must be referred to under item 1 and annexed to this report

# INTERNATIONAL PREISMINARY EXAMINATION REPORT

Internal application No. PC 133R 99/00545

5	Statement				: '			
	Novelty (N)	Claims	1-3			•	•	YE
		Claims						NO
Inventive step	Inventive step (IS)	Claims	1-3	,		. ".		YE
		Claims						N
	Industrial applicability (IA)	Claims	1-3		······ · · · · · · · · · · · · · · · ·			YI
	•	Claims						NO

The following documents were cited in the search report:

D1 DE 43 22 029 C1

D2 GB 2 176 632 A

D3 JP 02-227 632 A

D4 DE 197 14 788 A1

From all cited references represents D1 the most relevant state of the art. D1 discloses an optical cable terminal box which comprises a sealed cable sleeve body or splice chamber and a measuring device for determining the water vapor partial pressure. According to the specific embodiment, as shown in the figures 1 to 3, the measuring device consists in a humidity sensor with color indication. As stated in D1, column 2, lines 11 to 14 and lines 63 to 68, an electric sensor could alternatively be employed. The measured values are indicated by a display device integrated in the terminal box, and a transmission unit is provided which allows remote indication of the measured values. As explicated in D1, column 2, lines 21 to 53, detected analog signals of the humidity are converted by an analog/digital converter and transmitted to an evaluation unit. Additionally, an alarm device generates failure signals.

The subject matter of claims 1, 2 and 3 of the present application differs from this prior art in that in addition to humidity also the temperature is measured, and in that the water sensing meter (as characterized in claim 2 and 3) comprises the following means which are not explicitly mentioned in D1 nor rendered obvious:

- a key entry part
- a microcomputer

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box V (page 1)

- a LCD display
- a memory set.

With regard to these features the subject matter of the present application is considered new and including an inventive step.

D2 and D3 relate to optical cable joint closures having a humidity sensor (D2) or water immersion sensor (D3) integrated in the closure. Details of a humidity detecting and indicating system are not disclosed in D2 and D3.

D4 discloses a cable joint closure in lamp mast for street light control having a relay which comprises a mechanical key for relay testing. Sealing measure are provided to prevent the ingress of water into the interior of the closure. D4 refers to a state of the art which is less relevant.

The requirement of industrial applicability is complied with for all claims 1 to 3.



#### From the INTERNATIONAL BUREAU

#### PCT

### NOTIFICATION CONCERNING SUBMISSION OR TRANSMITTAL OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

ΙTα

YIM, Suk, Jae 8th floor Poonglim Building 823-1, Yeoksam-dong Kangnam-ku Seoul 135-784 RÉPUBLIQUE DE CORÉE

Date of mailing (day/month/year) 12 October 1999 (12.10.99)	THE OBEIGGE SE SOME
Applicant's or agent's file reference 99-PCT-006	IMPORTANT NOTIFICATION
International application No. PCT/KR99/00545	International filing date (day/month/year) 14 September 1999 (14.09.99)
International publication date (day/month/year)  Not yet published	Priority date (day/month/year) 31 May 1999 (31.05.99)
Applicant SAMJIN INTELLIGENCE COMMUNICATI	ON CO., LTD. et al

- 1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- 2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
- 3. An asterisk(\*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- 4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date Priority application No.

Country or regional Office or PCT receiving Office

Date of receipt of priority document

31 May 1999 (31.05.99)

1999/19816

KR

05 Octo 1999 (05.10.99)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland

Authorized offices

Maria Victoria CORTIELLO

Facsimile No. (41-22) 740.14.35

Telephone No. (41-22) 338.83.38



YIM, 8th floor NOTICE INFORMING THE APPLICANT Poonglim Building COMMUNICATION OF THE INTERNATIONAL 823-1 Yeoksam-dong APPLICATION TO THE DESIGNATED OFFICES Kangnam-ku Seoul 135-784 (PCT Rule 47.1(c), first sentence) RÉPUBLIQUE DE CORÉE Date of mailing (day/month/year) 07 December 2000 (07.12.00) Applicant's or agent's file reference 99-PCT-006 IMPORTANT NOTICE International application No. International filing date (day/month/year) Priority date (day/month/year) PCT/KR99/00545 14 September 1999 (14.09.99) 31 May 1999 (31.05.99) **Applicant** SAMJIN INTELLIGENCE COMMUNICATION CO., LTD. et al

 Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time: CN,DE,JP

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

 Enclosed with this Notice is a copy of the international application as published by the International Bureau on 07 December 2000 (07.12.00) under No. WO 00/73834

# REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or plected of plected.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide Copy

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Authorized officer

J. Zahra

Telephone No. (41-22) 338.83.38

ra 일찍완료 2000.12.21

3693759

Facsimile No. (41-22) 740.14.35



From the INTERNATIONAL BUREAU

PCT YIM, Suk, Jae NOTIFICATION OF RECEIPT OF 8th floor **RECORD COPY** Roonglim Building 823-1, Yeoksam-dong (PCT Rule 24.2(a)) kangnam-ku Seoul 135-784 副所長 長 RÉPUBLIQUE DE CORÉE Date of mailing (day/month/year) IMPORTANT NOTIFICATION 12 October 1999 (12.10.99) Applicant's or agent's file reference International application No. 99-PCT-006 PCT/KR99/00545

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

SAMJIN INTELLIGENCE COMMUNICATION CO., LTD. (for all designated States except

LEE, Jae-Sung (all designated States)

International filing date

14 September 1999 (14.09.99)

Priority date(s) claimed

31 May 1999 (31.05.99)

Date of receipt of the record copy by the International Bureau

05 October 1999 (05.10.99)

List of designated Offices

National : CN, DE, JP, US

#### **ATTENTION**

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the international Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

time limits for entry into the national phase

confirmation of precautionary designations

requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland

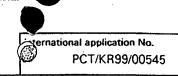
Authorized officer:

Maria Victoria/

Facsimile No. (41-22) 740.14.35

Telephone No. (41-22) 338.83.38





#### INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated in the Notification of Receipt of Record Copy (Form PCT/IB/301) by paying national fees and furnishing translations, as prescribed by the applicable national laws.

The time limit for performing these procedural acts is 20 MONTHS from the priority date or, for those designated States which the applicant elects in a demand for international preliminary examination or in a later election, 30 MONTHS from the priority date, provided that the election is made before the expiration of 19 months from the priority date. Some designated (or elected) Offices have fixed time limits which expire even later than 20 or 30 months from the priority date. In other Offices an extension of time or grace period, in some cases upon payment of an additional fee, is available.

In addition to these procedural acts, the applicant may also have to comply with other special requirements applicable in certain Offices. It is the applicant's responsibility to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most designated Offices do not issue reminders to applicants in connection with the entry into the national phase.

For detailed information about the procedural acts to be performed to enter the national phase before each designated Office, the applicable time limits and possible extensions of time or grace periods, and any other requirements, see the relevant Chapters of Volume II of the PCT Applicant's Guide. Information about the requirements for filing a demand for international preliminary examination is set out in Chapter IX of Volume I of the PCT Applicant's Guide.

GR and ES became bound by PCT Chapter II on 7 September 1996 and 6 September 1997, respectively, and may, therefore, be elected in a demand or a later election filed on or after 7 September 1996 and 6 September 1997, respectively, regardless of the filing date of the international application. (See second paragraph above.)

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

#### CONFIRMATION OF PRECAUTIONARY DESIGNATIONS

This notification lists only specific designations made under Rule 4.9(a) in the request. It is important to check that these designations are correct. Errors in designations can be corrected where precautionary designations have been made under Rule 4.9(b). The applicant is hereby reminded that any precautionary designations may be confirmed according to Rule 4.9(c) before the expiration of 15 months from the priority date. If it is not confirmed, it will automatically be regarded as withdrawn by the applicant. There will be no reminder and no invitation. Confirmation of a designation consists of the filing of a notice specifying the designated State concerned (with an indication of the kind of protection or treatment desired) and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.

#### REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or international application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before that date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau or if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity to furnish the priority document within a time limit which is reasonable under the circumstances.

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit is the filling date of the earliest application whose priority is claimed.

# From the INTERNATIONAL SEARCHING AUTHORITY

То:	PCT
YIM Suk Jae YOON, Woo Sung 8th Floor, Poonglim Bldg. 823-1 Yeoksam dong 深abhhanf-ku民 所 Seoul 135-784, Republic of Korea	NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION (PCT Rule 44.1)
	Date of mailing (day/month/year) 29 Mrz. 2000 (29.03.00)
Applicant's or agent's file reference 99-PCT-006	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT / KR 99/00545	International filing date (day/month/year)  14 Sep. 1999 (14.09.99)
Applicant SAMJIN Intelligence Communication CO., Ltd. et al.	
Filing of amendments and statement under Article The applicant is entitled, if he so wishes, to amend the When? The time limit for filing such amendme international search report; however, for r Where? Directly to the International Bureau of W 34, chemin des Colombett 1211 Geneva 20, Switzerl Facsimile No.: (41-22) 74	claims of the international application (see Rule 46): ints is normally two months from the date of transmittal of the more details, see the notes on the accompanying sheet.  IPO tes and 40.14.35
2. The applicant is hereby notified that no international sea 17(2)(a) to that effect is transmitted herewith.	arch report will be established and that the declaration under Article
the protest together with the decision thereon h applicant's request to forward the texts of both t no decision has been made yet on the protest; the	dditional fee(s) under Rule 40.2, the applicant is notified that:  as been transmitted to the International Bureau together with the the protest and the decision thereon to the designated Offices.  the applicant will be notified as soon as a decision is made.
applicant wishes to avoid or postpone publication, a notic claim, must reach the International Bureau as provided in the technical preparations for international publication.	al application will be published by the International Bureau. If the ce of withdrawal of the international application, or of the priority Rules 90bis.1 and 90bis.3, respectively, before the completion of
Within 20 months from the priority date, the applicant must r	pernational preliminary examination must be filed if the applicant 30 months from the priority date (in some Offices even later).  perform the prescribed acts for entry into the national phase before the personal date election within 19 months from the priority date that the priority date is appeared.
Name and mailing address of the ISA/  AT  AUSTRIAN PATENT OFFICE	Authorized officer  Koch  ZE  2000. 4. 0 3
Kohlmarkt 8-10 Facsimile No. A-1014 Vienna Form PCT/ISA/220 (July 1998)	Telephone No. +43/1/534 24 - 450 OF Surving Thee!



These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

### What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.



# $\mathbb{PCT}$

# INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Appli	icant's or agent's file reference	FOR TIMETER				
	PCT-006	FOR FURTHER ACTION	ACTION (Form PCT/ISA/220) as well as, where applicable, item 5 below.			
1	national application No.	International filing date (	day/month/year)	(Earliest) Priority Date (day/month/year)		
PC	T/KR 99/00545	14 September 19	99 (14.09.99)	31 May 1999 (31.05.99)		
Appli	icant	**************************************				
SA	MJIN Intelligence Commu	nication CO., Ltd.	et al.			
This	international search report has been rding to Article 18. A copy is being	prepared by this Interna transmitted to the Intern	tional Searching A ational Bureau.	uthority and is transmitted to the applicant		
This	international search report consists	of a total of 4	sheets.	,		
	It is also accompanied	1 by a copy of each prior	art document cited	i in this report.		
1.	Basis of the report  a. With regard to the language, language in which it was filed	the international search , unless otherwise indica	was carried out on steed under this item	the basis of the international application in the		
	the international search was Authority (Rule 23.1(b)).	as carried out on the basi	s of a translation o	f the international application furnished to this		
	b. With regard to any nucleotide search was carried out on the	e and/or amino acid sec basis of the sequence lis	uence disclosed in ting:	the international application, the international		
	contained in the internation	onal application in writte	n form.			
	filed together with the int	ernational application in	computer readable	form.		
	furnished subsequently to	this Authority in writter	n form.			
	furnished subsequently to	this Authority in compu	iter readable form.			
	the statement that the sub international application	sequently furnished writ as filed has been furnish	ten sequence listing	g does not go beyond the disclosure in the		
	the statement that the info	ormation recorded in con	nputer readable for	m is identical to the written sequence listing has		
2.	Certain claims were fou	nd unsearchable (See E	Box I).			
3.	Unity of invention is lac	king (See Box II).				
4.	With regard to the title,					
	the text is approved as sui	bmitted by the applicant				
	the text has been establish	ned by this Authority to	read as follows:	`		
5.	With regard to the abstract,					
	the text is approved as su	bmitted by the applicant				
	the text has been establish within one month from the	ned, according to Rule 3	8.2(b), by this Auth	nority as it appears in Box III. The applicant may, the report, submit comments to this Authority.		
6.	The figure of the drawings to be p	ublished with the abstra	ct is Figure No.:	3		
	as suggested by the applic		-	None of the figures.		
1	because the applicant fail					
	because this figure better	•	ion.	· /		
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Form PCT/ISA/210 (first sheet) (July 1998)





Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)							
The present invention relates to an optical cable closure maintenance system comprising a closure (10) including a sealed no-power electronic sensor (11), and a water sensing meter (20) for detecting information about the temperature and humidity within the closure (10), provided through the no-power electronic sensor (11), wherein the inundation therin can be detected without opening the closure (10).							
*							



al application No. PCT/KR 99/00545

29 March 2000 (29.03.00)

Gronau

Authorized officer

Telephone No. 1/53424/348

# CLASSIFICATION OF SUBJECT MATTER IPC<sup>7</sup>: G02 B 6/44; H 02 G 15/10, 15/18 According to International Patent Classification (IPC) or to both national classification and IPC FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC<sup>7</sup>: G 02 B 6/44, 6/36; H 02 G 15/10, 15/18, 15/28 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPOQUE (EPODOC, WPI) DOCUMENTS CONSIDERED TO BE RELEVANT Category\* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. DE 4322029 C1 (FELTEN & GUILLEAUME) 01 June 1994 A 1,2 (01.06.94) column 1, line 18 - column 3, line 3; fig. 1-3. GB 2176024 A (TELEPHONE CABLES LTD.) 10 December 1986 A (10.12.86), fig. 1,2; page 1, lines 86-87. Α JP 02-227632 A (TOKAI RUBBER IND LTD.) 10 September 1990 (10.09.90), fig. 1-6. Α DE 19714788 A1 (LIC LANGMATZ GMBH) 15 October 1998 (15.10.98), column 1, line 3 - column 2, line 17; fig. Further documents are listed in the continuation of Box C. See patent family annex. Special categories of cited documents: "T" later document published after the international filing date or priority "A" document defining the general state of the art which is not date and not in conflict with the application but cited to understand considered to be of particular relevance the principle or theory underlying the invention "E" earlier application or patent but published on or after the international "X" document of particular relevance; the claimed invention cannot be filing date considered novel or cannot be considered to involve an inventive step L" document which may throw doubts on priority claim(s) or which is when the document is taken alone cited to establish the publication date of another citation or other "Y" document of particular relevance; the claimed invention cannot be special reason (as specified) considered to involve an inventive step when the document is "O" document referring to an oral disclosure, use, exhibition or other combined with one or more other such documents, such combination being obvious to a person skilled in the art "P" document published prior to the international filing date but later than "&" document member of the same patent family the priority date claimed Date of the actual completion of the international search Date of mailing of the international search report

Form PCT/ISA/210 (second sheet) (July 1998)

Kohlmarkt 8-10; A-1014 Vienna

Name and mailing adress of the ISA/AT

Austrian Patent Office

Facsimile No. 1/53424/200

10 February 2000 (10.01.00)

# INTERNATION PA

# L SEARCH REPORT

In lal application No. PCT/KR 99/00545

	Patent document cited in search report		atent document cited Publication Patent f in search report date member				Publication date	
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		21,0024	23-11-1988	EΡ	A3	204581	<b>2</b> 0-04-1988	
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		·		GB	AO	8613821		
JP	A2	2227632	10-09-1990				09-07-1986	
DE	A1	19714788	15-10-1998			none		
			13-10-1998			none		



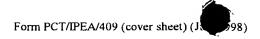
# **PCT**

TEOD 12 NOV 2001

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

99-PCT-006	FOR FURTHER ACT	Examination Report (Form PCT/IPEA/416)		
International application No.	International filing date (da	ny/month/year)	Priority Date (day/month/year)	
PCT/KR 99/00545	14 September 199	9	31 May 1999 (31.05.1999)	
	(14.09.1999)			
International Patent Classification (IPC) or nation	onal classification and IPC	· -		
IPC <sup>7</sup> : G02B 6/44, H02G 15/10, 18	5/18			
SAMJIN Intelligence Communicat	tion CO., Ltd. et al.			
This international preliminary exa- and is transmitted to the applicant	mination report has beer according to Article 36	prepared by this l	nternational Preliminary Examination Authority	
2. This REPORT consists of a total of	of 4 sheets, i	ncluding this cove	r sheet.	
This report is also accompa amended and are the basis 70.16 and Section 607 of the	for this report and/or sh	eets containing red	ription, claims and/or drawings which have been etifications made before this Authority (see Rule CT).	
These annexes consist of a total of	f s	heets.		
3. This report contains indications re	lating to the following it	ems:		
I. Basis of the opin	ion			
II. Priority				
III. Non-establishmer	nt of opinion with regard	l to novelty, inven	tive step and industrial applicability	
IV. Lack of unity of i	nvention			
V. Reasoned statement citations and ex	ent under Rule 66.2(a)(i planations supporting su	i) with regard to n ich statement	ovelty, inventive step or industrial applicability:	
VI. Certain documen	ts cited			
VII. Certain defects in	the international applic	ation		
VIII. Certain observati	ons on the international	application		
Date of submission of the demand		Date of completion	on of this report	
13 January 2000 (13.	01.2000)	27	July 2001 (27.07.2001)	
Name and mailing address of the IPEA/A	T	Authorized office	т	
Austrian Patent Office			CRONALI	
Kohlmarkt 8-10 A-1014 Vienna			GRONAU	
Facsimile No. 1/53424/200		Telephone No. 1/53424/320		



International application No.
PCT/KR 99/00545

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

I.		Basis of the report
1.	Witl	h regard to the elements of the international application:*
	$\boxtimes$	the international application as originally filed
		the description:
		pages, as originally filed
		pages, filed with the demand
		pages, filed with the letter of
		the claims:
		pages, as originally filed
		pages, as amended (together with any statement) under Article 19
		pages, filed with the demand
		pages, filed with the letter of
		the drawings:
		pages, as originally filed
		pages, as originally fried pages, filed with the demand
		pages, filed with the letter of
	$\Box$	
		the sequence listing part of the description:
		pages, as originally filed
		pages, filed with the demand pages, filed with the letter of
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2.	whic	h regard to the language, all the elements marked above were available or furnished to this Authority in the language in ch the international application was filed, unless otherwise indicated under this item.  se elements were available or furnished to this Authority in the following language which is:
		the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
		the language of publication of the international application (under Rule 48.3(b)).
		the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3.		h regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international iminary examination was carried out on the basis of the sequence listing:
		contained in the international application in printed form.
		filed together with the international application in computer readable form.
		furnished subsequently to this Authority in written form.
		furnished subsequently to this Authority in computer readable form.
		The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
		The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4.		The amendments have resulted in the cancellation of:
		the description, pages
		the claims, Nos
		the drawings, sheets/fig
5.		This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**
ii	n this	cement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and
	(0.17). Inv re	placement sheet containing such amendments must be referred to under item I and annexed to this report



# Internation No. PCT/KR 99/00545

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

V. Reasoned statement under Art citations and explanations sup	icle 35(2) porting s	) with regard to novelty, inventive step or industrial applicability; uch statement	
1. Statement			
Novelty (N)	Claims	1-3	YES
	Claims	·	NO
Inventive step (IS)	Claims	1-3	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-3	YES
	Claims		NO
Citations and explanations (Rule 70.	7)	•	

The following documents were cited in the search report:

D1 DE 43 22 029 C1

D2 GB 2 176 632 A

D3 JP 02-227 632 A

D4 DE 197 14 788 A1

From all cited references represents D1 the most relevant state of the art. D1 discloses an optical cable terminal box which comprises a sealed cable sleeve body or splice chamber and a measuring device for determining the water vapor partial pressure. According to the specific embodiment, as shown in the figures 1 to 3, the measuring device consists in a humidity sensor with color indication. As stated in D1, column 2, lines 11 to 14 and lines 63 to 68, an electric sensor could alternatively be employed. The measured values are indicated by a display device integrated in the terminal box, and a transmission unit is provided which allows remote indication of the measured values. As explicated in D1, column 2, lines 21 to 53, detected analog signals of the humidity are converted by an analog/digital converter and transmitted to an evaluation unit. Additionally, an alarm device generates failure signals.

The subject matter of claims 1, 2 and 3 of the present application differs from this prior art in that in addition to humidity also the temperature is measured, and in that the water sensing meter (as characterized in claim 2 and 3) comprises the following means which are not explicitly mentioned in D1 nor rendered obvious:

- a key entry part
- a microcomputer



(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box V (page 1)

- a LCD display
- a memory set.

With regard to these features the subject matter of the present application is considered new and including an inventive step.

D2 and D3 relate to optical cable joint closures having a humidity sensor (D2) or water immersion sensor (D3) integrated in the closure. Details of a humidity detecting and indicating system are not disclosed in D2 and D3.

D4 discloses a cable joint closure in lamp mast for street light control having a relay which comprises a mechanical key for relay testing. Sealing measure are provided to prevent the ingress of water into the interior of the closure. D4 refers to a state of the art which is less relevant.

The requirement of industrial applicability is complied with for all claims 1 to 3.

# (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

# (19) World Intellectual Property Organization International Bureau



# 

# (43) International Publication Date 7 December 2000 (07.12.2000)

#### **PCT**

# (10) International Publication Number WO 00/73834 A1

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(51) International Patent Classification<sup>7</sup>: H02G 15/10, 15/18

G02B 6/44,

(71) Applicant and (72) Inventor: LEE, Jae-Sung [KR/KR]; #602-303 Kukhwa

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302-222 (KR).

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14 September 1999 (14.09.1999)

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(81) Designated States (national): CN, DE, JP, US.

(30) Priority Data:

1999/19816

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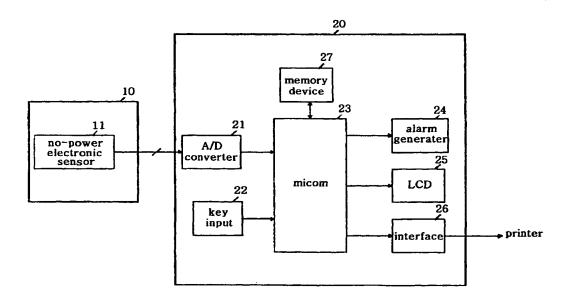
Published:

With international search report.

(71) Applicant (for all designated States except US): SAMJIN INTELLIGENCE COMMUNICATION CO., LTD. [KR/KR]; #535-9 Kwan-ri, Majang-myun, Yichon-shi, Kyungki-do 467-810 (KR).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

### (54) Title: OPTICAL CABLE CLOSURE MAINTENANCE SYSTEM



(57) Abstract: The present invention relates to an optical cable closure maintenance system comprising a closure (10) including a sealed no-power electronic sensor (11), and a water sensing meter (20) for detecting information about the temperature and humidity within the closure (10), provided through the no-power electronic sensor (11), wherein the inundation therein can be detected without opening the closure (10).

0/73834 A1

**Optical Cable Closure Maintenance System** 

### **Technical Field**

The present invention relates to an optical cable closure, or more particularly to the maintenance system capable of detecting inundation at said closure including a no-power electronic sensor without opening the same.

## **Background Art**

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Generally, the step of connecting the central office to the subscribers with optical cables requires many connection points. At these connection points, the connection materials for the optical cable, for example the optical cable closure or optical intermediate switch box or vacant terminal box, are installed to connect the optical cables to each other. The connection materials for the optical cable not only connect the optical cables snapped to each other, but also perform the task of avoiding a deterioration of the connection region due to the external environment.

The optical cable closure is commonly installed at a manhole etc. so that the connection region of the optical cable is protected from the external environment. However, it must have superior protection characteristics against the environment than other connection materials since the contaminated water is frequently full at the manhole etc. in contrast to the atmosphere, and the degree of air contamination existing at the manhole is more severe than that at the atmosphere. Particularly, the optical cable closure basically should have capability of sealing for cutting off permeation of contaminated water into the closure.

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If the state of inundation at the closure with the exposure of the optical fiber to moisture is continued, the function of the optical fiber is lost. Fig. 1 is a graph indicating the process at the varying intensity of the optical fiber as a function of time. Fig.2a is a diagram showing the surface of the optical fiber in normal environment, Fig.2b is a diagram showing the surface of the optical fiber after being exposed to moisture for a long period time, and Fig.2c is a diagram indicating the surface of the optical fiber exposed to chemicals. As shown in the drawings, it was found that the optical fiber is negatively affected and damaged thereby when the optical fiber is exposed to moisture or chemicals.

As described above, the fact that the performance of the optical fiber is degraded can be found only after the predetermined time has passed with exposure to moisture. In other words, since the defect in the communication equipment can be discovered only after a long period of time in the state of inundation of the optical cable closure, the subscribers who benefited the communication equipment meanwhile must put up with the inconvenience of generation of error or interruption in communication.

On the other hand, the conventional closure for the optical cable is waterproof by resealing the exterior of the closure with a gel compound etc. under sealing or by using a material such as sealing tapes in order to prevent water from permeating into the closure. In this case, it is impossible to check as to whether the water has permeated into the closure when the phenomena of aging occurs due to the defective

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work or closure or the long term use therof. Further, in addition to the fact that the waterproof material can not be recycled therein, the conventional closure entails inconvenience and economical loss since it involves reworking after dismantling in case of a problem within the box, with the result of much loss in human resources.

The object of the present invention, in resolving the aforementioned problems, is to provide a maintenance system capable of detecting inundation of the optical cable closure without opening the same.

The another object of the present invention is to provide an optical cable closure comprising a highly sensitive no-power electronic sensor.

The another object of the present invention is to provide a maintenance system capable of recording and storing the periodic measurement values of changes in humidity and temperature of the optical cable.

The another object of the present invention is to reduce the cost of human resources and the maintenance of the closure.

To achieve these goals, the present invention relates to an optical cable closure maintenance system comprising a closure including a sealed no-power electronic sensor, and a water sensing meter for detecting information about the temperature and humidity within the closure, provided through the no-power electronic sensor, wherein the inundation therein can be detected without opening the closure.

The detailed feature of the present invention is that said water sensing meter comprises an A/D converter converting a sensor analog signal of the humidity and

temperature within the closure detected by the no-power electronic sensor into a digital signal, a key entry part inputting a control signal and set data and the like according to a mode selection key, an up/down key and other respective functions, handled selectively by an user, a micom performing a general control function a set program, receiving inputs signals outputted from the respective portion, a liquid crystal display displaying the result of humidity detection, temperature detection and respective parameters at the closure provided by said A/D converter with numerals and letters, an alarm generator generating a failure alarm according to the control signal of the micom, a memory device for storing information provided by said A/D converter and an output signal of said micom, and an interface for outputting the information of said memory device to an external device.

The another detailed feature of the present invention is that said micom comprises a set memory having an allowable threshold valve information in the ratio of temperature to humidity at the closure.

# 15 Brief Description of the Drawing

Fig. 1 is a graph indicating the process at the varying intensity of the optical fiber as a function of time.

Fig.2a is a diagram indicating the surface of the optical fiber in the normal environment.

Fig.2b is a diagram indicating the surface of the optical fiber after being exposed to moisture for a long period of time.

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Fig.2c is a diagram indicating the surface of the optical fiber exposed to chemicals.

Fig.3 is a block diagram indicating the maintenance system according to the present invention.

Fig.4 is a diagram indicating the water sensing meter of the Fig.3.

# Detailed Description of the Preferred Embodiment

The constitution and operation features of the present invention are described in detail with accompanying drawings as follows. Fig.3 is a block diagram indicating the maintenance system according to the present invention. The invention comprises a closure (10) including a sealed no-power electronic sensor (11), and a water sensing meter (20) for detecting information about temperature and humidity within the closure, provided by said no-power electronic sensor (11). The water sensing meter (20) comprises an A/D converter (21) converting an analog signal detected by the nopower electronic sensor (11) at the closure (10) into a digital signal, a key entry part (22) inputting a control signal of user, a micom (23) performing a general control function by a set program inputted by each output signals, a liquid crystal display (hereinafter LCD) (25) displaying information of detection results and respective parameter, provided by said A/D converter (21), an alarm generator (24) generating a warning alarm according to the control signal of said micom (23), a memory device (27) for storing information provided by said A/D converter (21) and an output signal of said micom (23), and an interface (26) for outputting the information of said memory

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device (27) to the external device.

The closure (10) is basically sealed not to be inundated, however it is assumed that said box could be inundated since the point of the present invention is that the device can detect inundation which could occur as the time of sealing goes by. A highly sensitive no-power electronic sensor (11) is included in the form of a module within the closure (10) in order to detect temperature and humidity therein. The information detected by said no-power electronic sensor (11) is outputted in such manner of a serial port as RS232C, etc. The detection result of temperature and humidity in an analog style outputted by said no-power electronic sensor (11) is converted into the digital value through the A/D converter (21).

The converted sensor information of the temperature and humidity is delivered to a micom (23) by the buffer (not shown). The user can set an allowable temperature range of the temperature spec included at the water sensing meter (20), and the detection temperature within the allowable temperature in which the range is -30°C ~100°C is indicated at the LCD (25) with a digital unit of 1°C. Similarly, the humidity detected by the humidity spec therein is also indicated in the unit of 1%. The allowable threshold value information of the ratio of the temperature to the humidity is stored at the predetermined memory at the micom (23). Using this information, the micom (23) can recognize water permeation and surplus humidity within the closure through the detected information of the temperature and humidity.

Fig.4 is a diagram indicating the water sensing meter (20) according to the

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present invention. The water sensing meter (20) comprises a power switch (31) for switching the power supply of the water sensing meter, a mode selection switch (32) for selecting the sensing mode of the user, an up/down control key (33), a reset switch (36) for resetting the setting condition, a luminescence (35) for indicating a normal or fault condition, a LCD (34) displaying the operation condition and measurement results of the water sensing meter (20) with numerals and letters, a PS/2 port (38) receiving a sensor information of temperature and humidity from the electronic sensor (11) at the closure (10), and a printing switch (37) for outputting the detection results of the water sensing meter (20) via the interface (26) included through the serial port.

The description of the main operation procedure of said water sensing meter (20) is as follows. When the power of the water sensing meter (20) is turned on, the micom (23) executes an operation according to the program stored in the ROM (not shown) with built-in instruction codes. The initial operation is to turn on the normal lamp of the luminescence (35) and indicate the time value received from the real time clock (not shown) to the LCD (34). At this time, the time value allows the error range of 1/100 sec., and is controllable using the mode selection switch (32). The expanded timer supported till 2100 year is used.

The backup power supply of said timer operates separately from the main power supply. The LCD (34) is a low power LCD capable of indicating 2 lines x 8 letters, and has a function of indicating not only the temperature/humidity measurement results detected through the no-power electric sensor (11), but also the

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output state of the real time and each parameter.

The detected humidity value is read after specifying the mode to humidity using the mode selection switch (32) formed at the key input (22). The micom (23), like a conventional controller, comprises a ROM and RAM with built-in programs. The micom (23) compares the allowable base value of the ratio of the temperature to the humidity from the ROM to the measured humidity. If the measured humidity exceeds the allowable base value, the alarm is generated through the alarm generator (24) and the alarm display is indicated through the luminescence (35). The normal state is changed into the fault state if the detected humidity in the normal state exceeds the allowable base value. Therefore, the current state (humidity saturation or water permeation) of the closure being detected can be known.

In the same manner, the measured temperature value within the closure can be read by converting the mode selection switch (32) to the temperature sensor mode.

Now, the user can set the proper temperature range, and the method is as follows:

selecting a set mode with pushing all of the selection switches for 5 seconds at the temperature measurement display;

adjusting the lowest allowable temperature and the highest allowable temperature in order by the up/down control key (33); and

indicating the temperature alarm display with an alarm if the sensing
temperature exceeds the set temperature range, turning on the fault state lamp showing
state where the temperature detection result at the closure is not within the proper

range.

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On the other hand, each detected data of the temperature and the humidity using the mode selection switch (32) can be stored or deleted by the up/down control key (33). The values included in the temporary memory can be printed in a serial port manner by pushing a print selection switch (37). At this time, the measurement number, values for year/month/date/hour/minute, measurement order, measured humidity value and measured temperature value in order are outputted. A reset switch (36) which is not described here is to initialize the device when the water sensing meter (20) itself has a failure or faulty operation.

As described above, the optical cable closure maintenance system according to the present invention can recognize whether the inundation has occurred in the closure without opening the box, thereby preventing economic loss and waste of human resource due to the opening with respect to the components consumed for avoiding inundation.

Further, it is advantageous in that consistent maintenance can be done since the optical path section applying the optical cable closure maintenance system according to the present invention can be measured periodically, handling the information thereof, and these outputs obtained therefrom can be utilized as a main recoded information of the optical path section.

Additionally, it has the effect of preemptively preventing the damage loss caused by occurrence of an accident and failure at the optical cable connection point

due to a fault, deformation, damage or inundation of the closure.

## **Claims**

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What is claimed is:

- 1. An optical cable closure maintenance system comprising a closure containing a sealed no-power electric sensor, and a water sensing meter for detecting information of temperature and humidity inside of the closure, provided by said no-power electric sensor, wherein the inundation therein can be detected without opening said closure.
- 2. An optical cable closure maintenance system of Claim 1, wherein said water sensing meter comprises:
- an analog/digital converter converting analog signal of humidity and temperature within the closure, detected by the no-power electronic sensor into a digital signal,
  - a key entry part inputting a control signal and set data according to a mode selection key, an up/down key and other respective functions manipulated selectively by an user,
- a micom performing a general control function by a set program, receiving inputs of the signals outputted from the respective parts,
- a LCD part displaying, in numerals and letters, the result of humidity and temperature detections within the closure and respective parameters, provided via said analog/digital converter,
- an alarm generator generating a failure alarm according to the control signal of said micom,

a memory device for storing information provided by said analog/digital converter and an output signal of said micom, and

an interface for outputting the information of said memory device to an external device.

3. An optical cable closure maintenance system of Claim 2, wherein said micom comprises a set memory having information of an allowable threshold value of the ratio of temperature to humidity within said closure.

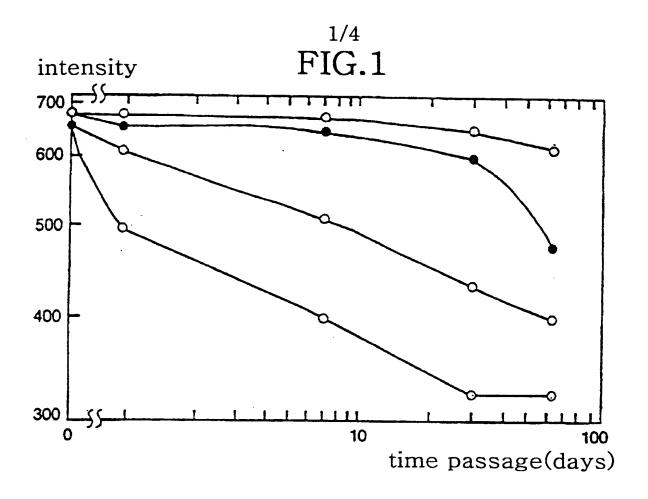
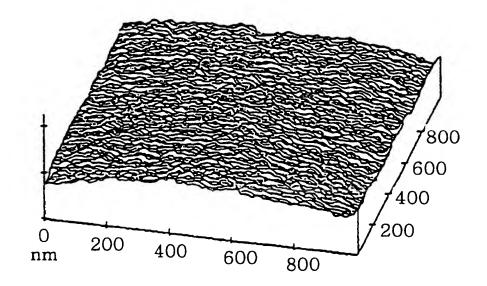


FIG.2A



2/4 FIG.2B

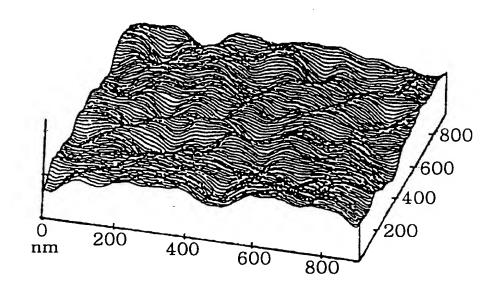
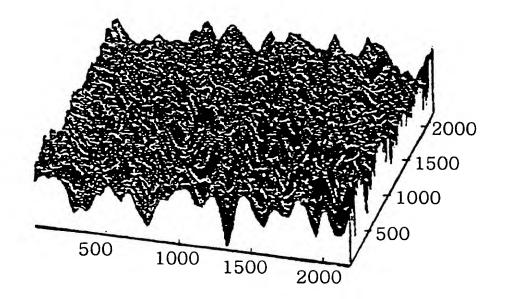


FIG.2C



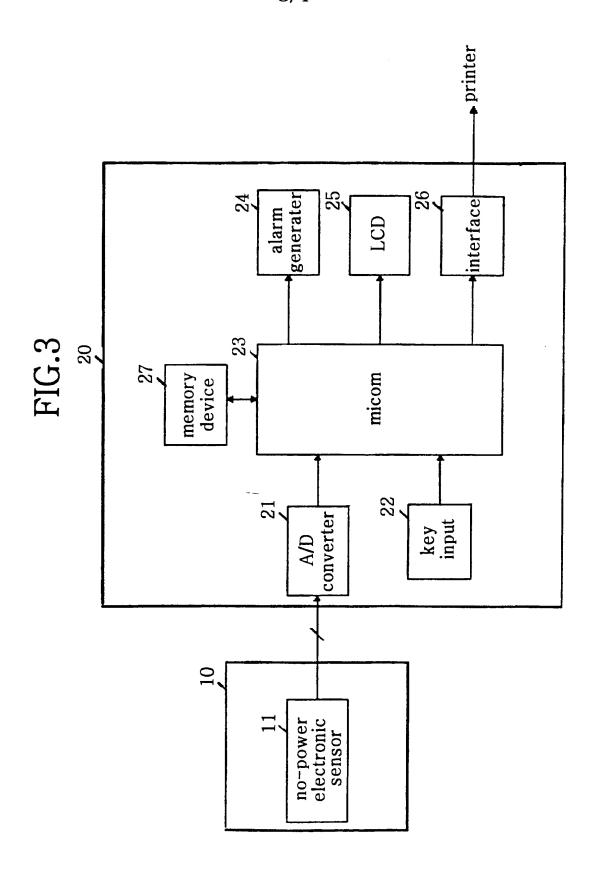
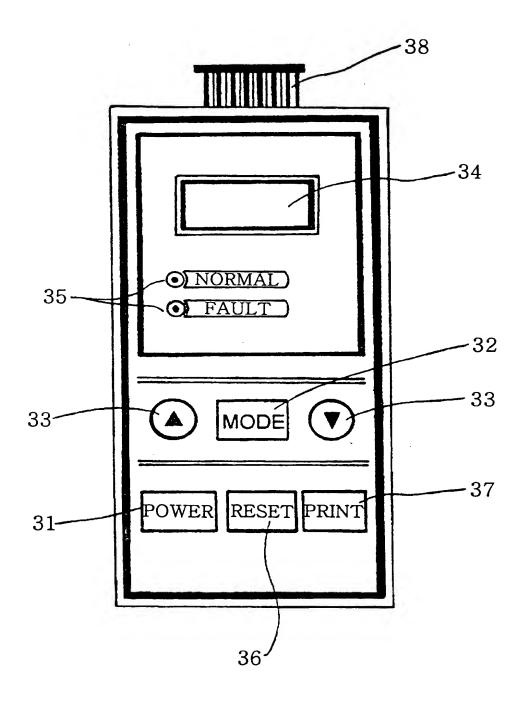
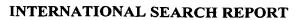


FIG.4





International application No. PCT/KR 99/00545

A. CLAS	SIFICATION OF SUBJECT MATTER		
IPC <sup>7</sup> : G02	2 B 6/44; H 02 G 15/10, 15/18		
According to	o International Patent Classification (IPC) or to both n	national classification and IPC	
B. FIELD	OS SEARCHED		
1	ocumentation searched (classification system followed		
IPC': G 0	2 B 6/44, 6/36; H 02 G 15/10, 15/18, 15	5/28	
Documentati	on searched other than minimum documentation to the	ne extent that such documents are included i	n the fields searched
Electronic da	ata base consulted during the international search (nar	ne of data base and where practicable sear	ch terms used)
	(EPODOC, WPI)	, , , , , , , , , , ,	arterna asoa)
C. DOCU	MENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where approp	priate of the relevant passages	Relevant to claim No.
Cutegory	Charlot of document, with mulcation, where approp	oriate, of the relevant passages	Relevant to claim No.
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A	GB 2176024 A (TELEPHONE CABLI (10.12.86), fig. 1,2; page 1, lines 86-87		1
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Further	documents are listed in the continuation of Box C.	See patent family annex.	
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considered	to be of particular relevance	date and not in conflict with the application the principle or theory underlying the inver-	ition
## carlier app filing date	lication or patent but published on or after the international	"X" document of particular relevance; the claim considered novel or cannot be considered to	ned invention cannot be
	which may throw doubts on priority claim(s) or which is ablish the publication date of another citation or other	when the document is taken alone	•
speciał rea	son (as specified)	"Y" document of particular relevance; the claim considered to involve an inventive step wh	en the document is
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"P" document j	published prior to the international filing date but later than a date claimed	"&" document member of the same patent fami	
	ctual completion of the international search	Date of mailing of the international search	report
	10 February 2000 (10.01.00)	29 March 2000 (29.0	03.00)
	uling adress of the ISA/AT	Authorized officer	
	Patent Office	C	
	t 8-10; A-1014 Vienna	Gronau	
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# INTERNATIONAL SEARCH REPORT

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